

We claim:

1 1. A device for measuring electrical potential in a
2 sample comprising:
3 an electrode body formed with two electrically separate
4 surfaces positioned to contact simultaneously a sample;
5 a electrical excitation source connected to one of said
6 surfaces for feeding an electrical excitation signal to said
7 sample; and
8 an electrical potential measuring unit connected to the
9 other of said surfaces for measuring an electrical potential in
10 said sample resulting from application of said electrical
11 excitation signal to said sample.

1 2. The device defined in claim 1 wherein the area of
2 said other of said surfaces for measuring said electrical
3 potential in said sample is smaller by a factor of at least 10
4 than the area of said one of said surfaces for feeding said
5 electrical excitation signal to said sample.

1 3. The device defined in claim 1 wherein the two
2 electrically separate surfaces are separated by an annular
3 insulator.

1 4. The device defined in claim 1 wherein said other of
2 said surfaces for measuring an electrical potential in said
3 sample is formed upon a pointed tip of said body adapted to be
4 driven into said sample.

1 5. The device defined in claim 4 wherein said one of
2 said surfaces is a jacket of said body.

1 6. The device defined in claim 5 wherein said body is
2 a spike adapted to be driven into the ground.

1 7. The device defined in claim 6 wherein said tip of
2 said spike is a solid metal tip.

1 8. The device defined in claim 7 wherein said jacket
2 is a metal tube.

1 9. The device defined in claim 8 wherein the tip of
2 said spike is composed a more noble metal than said jacket.

1 10. The device defined in claim 9 wherein the jacket
2 is separated from the tip by an annular insulator.

1 11. The device defined in claim 10, further comprising
2 a flexible electrical conductor extending upwardly through said
3 tube and connected to said tip.

1 12. The device defined in claim 11, further comprising
2 an insulator extending through said tube and separating said
3 flexible electrical conductor from said jacket.

1 13. The device defined in claim 10, further comprising
2 a solid metal rod or tube extending upwardly from said tip
3 through said jacket to supply an electrical potential measurement
4 to an electric circuit.

1 14. The device defined in claim 13, further comprising
2 an insulating tube surrounding said solid metal rod or tube for
3 insulating said solid metal rod or tube from said jacket.

1 15. An apparatus for measuring conductivity of a
2 sample, comprising two electrode bodies each formed with two
3 electrically separate surfaces positioned to contact
4 simultaneously a sample, said electrode bodies being spaced apart
5 in said sample; a electrical excitation source connected to one
6 of said surfaces of each electrode body for feeding an electrical
7 excitation signal through said sample; and an electrical
8 potential measuring unit connected to the other of said surfaces
9 of each electrode body for measuring an electrical potential
10 across said sample resulting from application of said electrical
11 excitation signal to said sample.

1 16. A device for measuring a three-dimensional
2 tomographic electrical conductivity distribution in a sample,
3 comprising a plurality of electrode spikes driven into the ground
4 in spaced-apart relationship, each of said spikes comprising an
5 electrode body formed with two electrically separate surfaces
6 positioned to contact simultaneously said sample;
7 a electrical excitation source connected to one of said
8 surfaces of each spike for feeding an electrical excitation
9 signal to said sample; and
10 an electrical potential measuring unit connected to the
11 other of said surfaces of said spikes for measuring an electrical

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- 12 potential in said sample resulting from application of said
- 13 electrical excitation signal to said sample.